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U. S. Department of Agriculture

SPRUCE BUDWORM SURVEYS IN MAINE IN 1949

Ground Surveys:

The acreage of forest land in northern Maine found to be generally infested in 1949 by the spruce budworm increased considerably over that reported in 1948. Early in June the general forest insect survey, conducted by the State Entomologist through the help of the forest insect rangers and the forest fire wardens, indicated that budworms could be commonly found throughout practically all of the spruce-fir region of Maine, with the exception of Washington and Hancock Counties, in the southeastern part of the State. The results of these ground surveys are shown in the spruce budworm collections map, each collecting point being designated by a black dot. The number of infested towns and a summary of specimens collected each year since 1941 are shown in table 1.

Table 1. The number of towns in which spruce budworms were collected and a summary of the specimens collected each year since 1941

Year	Number of Collections	Towns	Larvae	Pupae	Pupal Cases	Moths	Egg Masses	TOTAL
1941	2	2		1		12		13
1942	6	6	4			18		22
1943	3	3				3		3
1944	8	5	4	1				5
1945	38	31	56	1		21		78
1946	67	49	304			13		317
1947	218	146	424	60	149	71		704
1948	419	181	1123	43	157	128	218	1451*
1949	699	272	3332	608	213	223**	248	4376*

* Egg-mass collections are not included in the total as they actually represent the 1950 populations.

**Nineteen light traps were run this year. There was an increase in moths collected over 1948 at Oquossoc, T3R12, T11R8, and Ashland.

The greater part of the infested acreage was in the northern tier of towns in Aroostook County, north of Ashland and west of the "potato country." In addition, there were smaller acreages of general infestation in the Patten-Mount Chase area, west of Houlton; in T11R9, west of Ashland; in Dennistown, Moose River, and Sandy Bay, northwest of Jackman; and in the vicinity of Russell Mountain, north of Moosehead Lake.

Authoritative records for two years from the Maine observation points showed a very definite upward trend in the 1949 population. The figures for these points are based on the collection of large larvae and pupae, the number per 15-inch twig sample, for both 1948 and 1949, being shown in table 2. Seventeen of these, previously with no infestation and indicated as .00 in the 1948 column, had an appreciable population in 1949.

Table 2. Increase in spruce budworm populations (large larvae and pupae) at Maine Observation Points in 1949.*

County	Township	Number of spruce budworms per 15-inch twig sample 1948	1949
Aroostook (western)	17R11 - Allagash	.55	.95
	16R11 - Allagash	.15	.90
	16R10 - Allagash	.50	1.55
	16R10 - Allagash	.60	1.50
	16R10 - Allagash	.25	1.20
	16R10 - Allagash	.20	.90
	16R9	.20	.60
	11R14	.10	.05
Aroostook (eastern)	14R6	.50	1.60
	Stockholm	1.30	5.50
	16R4	.55	3.00
	Garfield	.65	1.00
	8R5	.30	1.10
	Ashland	.35	1.50
	3R2	.00	.05
Somerset	Bingham	.00	.05
	Parlin Pond	.00	.45
	Dennistown	.10	1.20
	Taunton-Raynham	.00	.45
	Tomhegan	.00	.65
	5R16 - Russell Mt.	.70	.60
	Hammond	.00	1.00
	Seboomook	.00	.65
	Boundary Bald Mt.	.00	.15
Piscataquis	10R12	.05	.05
	Shirley	.00	.75
	Dover-Foxcroft	.00	.15
	Greenville	.00	1.00
	Lily Bay	.05	.05
	2R13	.10	.60
	Chesuncook	.05	.20
	4R10	.00	.05
	Grindstone	.00	.30
	Mount Chase	.10	.65
	6R7	.00	.45
Franklin	Seven Ponds	.00	.05
	Chain of Ponds	.00	.15
Oxford	Lynchtown	.00	.05

* In 1948, based on 2 15-inch twig samples from each of 10 trees; in 1949, based on 5 15-inch twig samples from each of 5 trees.

Aerial Surveys:

A very large proportion of the infested area, especially in the northwestern part of Aroostook County, is "roadless" and a comprehensive ground survey, to determine the extent of the affected area and the degree of infestation, was not possible because of the limited manpower and the time to accomplish it. Inasmuch as it was believed that as little as 25 percent foliage injury would be noticeable from the air, arrangements were made for a preliminary flight by forester-pilot R. C. Heller, of the Beltsville Laboratory, and H. J. MacAloney, of the New Haven Laboratory, of the Bureau of Entomology and Plant Quarantine. This flight was made on June 22, in a highwing Aeronca "Chief," over the forested area in the vicinity of Stockholm and Soldier Pond, locations known to have suffered noticeable defoliation in 1948. As a result of this flight, made at a low altitude, it was determined that defoliation was noticeable - even on scattered trees along the entire line of flight between these locations. With this development it was decided to carry out an aerial survey, with two bases of operation designed to cover the entire forested area in the northern part of the State. Mr. Heller, flying the Aeronca out of Caribou, surveyed much of the country east of the Allagash River and as far south as Moosehead Lake, and in addition made one flight to the Jackman and Rangeley Districts, covering the Patten-Mount Chase area on the way. These flights were made at an air speed ranging from 70 to 80 miles per hour and from 100 to 500 feet above the crown canopy, the lower altitude being used chiefly for close examination of suspected trees, or for color photography with a 35-mm camera. Flying with him were J. L. Bean, H. J. MacAloney, and W. E. Waters, of the New Haven Laboratory, the greater part of the work being done by Mr. Bean.

Mr. Charles Coe, of the Maine Forest Service, piloted a two-place Luscombe pontooned plane out of Churchill Lake, with J. W. Marsh, Assistant State Entomologist, flying with him as observer. They covered the upper Saint John and Allagash Valleys and the country along the Maine-Quebec line as far south as Jackman. This plane cruised at about 100 miles per hour and at a greater average height, in order to maintain flight. Ranger Bullock made three flights into the Shin Pond and Millinocket Lake districts.

The aerial coverage during the course of the survey, which was carried out between June 28 and July 9, is indicated in the aerial survey map. This was the period in 1949 when defoliation by the spruce budworm was most apparent; immediately following the latter date heavy rains and wind undoubtedly removed much of the denuded foliage still clinging to the twigs and by the middle of the month only the most heavily fed-on trees were readily spotted. The black-headed budworm continued to be abundant and in some localities part of the visible defoliation of balsam fir was due to feeding by this insect. In addition some discoloration of balsam fir was caused by late spring frosts in northern Maine and by drought later in the season in the central part of the State. However, ground checks of all suspicious areas made allowance for these factors and it is believed the aerial survey resulted in a more accurate "picture" of the situation than could possibly have been accomplished by a large ground crew in the time available. In most cases what appear to be "holes" or missed territory in the map are in reality lakes, hardwood ridges, or open country. Cross hatching has been utilized to bring out more clearly the areas where defoliation was most noticeable.

Egg-mass Surveys:

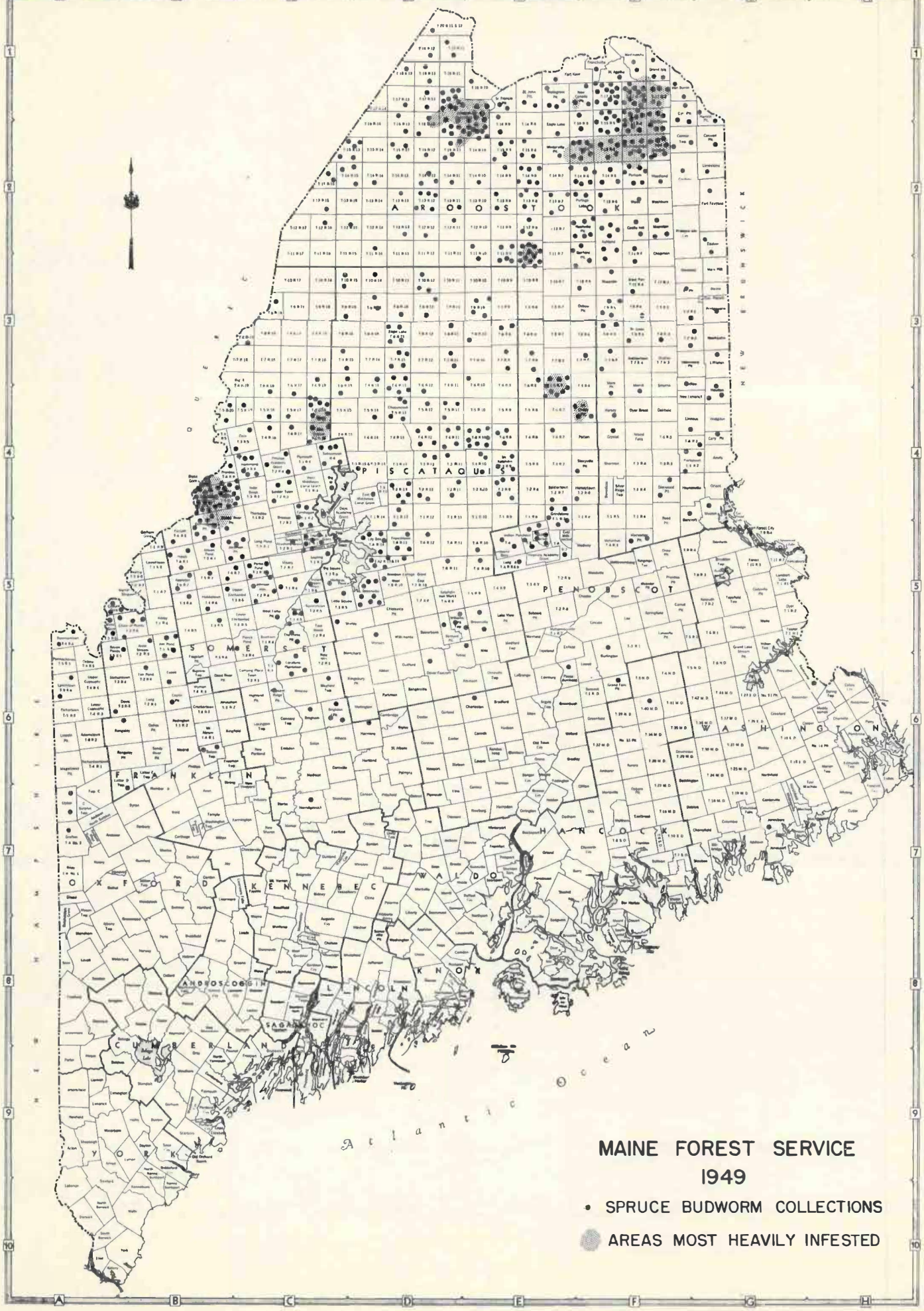
In 1948 an egg-mass survey was carried out in northern Aroostook County by the State and Federal agencies where noticeable feeding had been observed, as well as in the surrounding country. Although the infestation was "spotty" the area involved covered about 100,000 acres. Fifteen 15-inch twig samples were removed from the mid-crown of two trees in each location sampled. This survey, based on an average of 20 eggs per mass, indicated an overwintering population of 1000 to 3000 larvae per tree in the areas of heaviest feeding. Population and life history studies in 1949 showed this to be a reliable estimate.

Because of this apparently reliable estimate a similar survey was made in 1949 over a considerably larger acreage. The aerial survey indicated areas of noticeable defoliation and served as a basis for determining localities where egg-mass counts would be made. These counts were made wherever scattered groups of trees or larger areas were located and covered approximately 500,000 acres. To conform with the method for making larval collections at the observation points in 1949 the sampling method was changed so that five 15-inch twig samples were removed from five trees at each location; each egg mass was considered to average 20 eggs - as in 1948. The number of masses was low, as in 1948, in the southerly portion of the sampled area - Ashland and along the American Realty Road running west from that town. In the area of heavier population in the vicinity of Cross Lake and Stockholm the survey indicated a slightly higher population.

An area of several thousand acres southwest of Stockholm, having medium to heavy feeding in 1949 and chosen for additional spraying experiments in 1950, was rather intensively sampled and indicated an egg population of 2000 to 4000 per tree. Egg parasitization has decreased this considerably so that the overwintering population may not be greatly in excess of that in 1948. Detailed egg-mass counts at Soldier Pond, in connection with parasite studies, indicated a much heavier population, than elsewhere - approximately 9000 per tree being reported. The area of noticeable feeding in this location, however, is small - being about 100 acres. A relatively large area, of approximately 250,000 acres of roadless territory south of Eagle Lake was surveyed for the first time this year. At present this area can be listed as lightly infested as the average egg population at 12 stations was 1200 per tree. Sampling in the Jackman area by State employees showed a generally light egg-mass count, although one collection in Dennistown indicated about 4000 eggs per tree. Heavy egg parasitization was also reported from this general area.

Summing up the situation in northern Maine in 1949 - there was an increase in the budworm population over that in 1948 both in size of area infested and in population per tree. The infestation has not, however, reached the stage where serious damage may be expected in 1950.

H. B. Peirson, Maine Forest Service.
H. J. MacAloney, U. S. Department of Agriculture.
November 18, 1949.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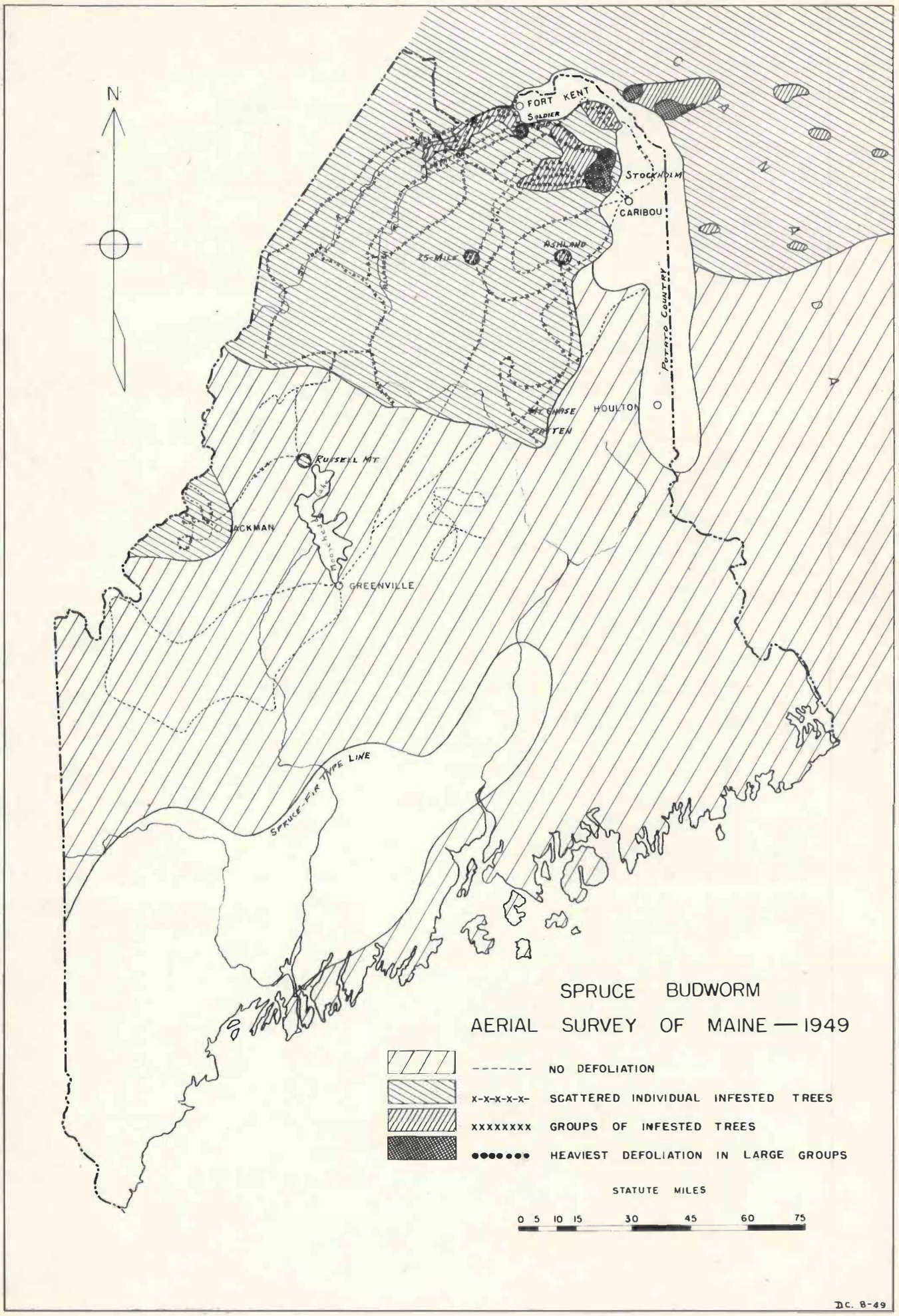
LINCOLN
SAGADAHOC
CUMBERLAND
YORK
Atlantic Ocean
MAINE FOREST SERVICE
1949
• SPRUCE BUDWORM COLLECTIONS
AREAS MOST HEAVILY INFESTED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MT CHASE
HOULTON
PATTEN
RUSSELL MT
LOCKMAN
GREENVILLE
SPRUCE-FIR TYPE LINE
SPRUCE BUDWORM
AERIAL SURVEY OF MAINE — 1949
NO DEFOLIATION
SCATTERED INDIVIDUAL INFESTED TREES
GROUPS OF INFESTED TREES
HEAVIEST DEFOLIATION IN LARGE GROUPS
STATUTE MILES
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